# SPECIFICATION FOR APPROVAL

| | | |
|---|---|---|
| CUSTOMER | : | |
| PRODUCT TYPE | : | HC-49/S |
| NOMINAL FREQ. | : | 12.000000MHz |
| TXC P/N | : | 9B12000013 |
| REVISION | : | A2 |
| CUSTOMER P/N | : | |
| PM / SALES | : | |
| DATE | : | |
| CUSTOMER CONFIRMATION | : | (Singnature) |
| | | (Date) |

**RoHS Compliant**

TXC CORPORATION

www.txccorp.com

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| PE/RD | QA | MFG |
|---|---|---|
| Simon Wang | Ton Hsieh | Shu-Chen Ko |
| 2019/8/21 | 2019/8/21 | 2019/8/21 |

**RoHS Compliant**

| Rev | Revise page | Revise contents | Date | Ref.No. | Reviser |
|---|---|---|---|---|---|
| A1 | N/A | Initial released | 2014/5/2 | N/A | Shu-Chen Ko |
| A2 | ALL | Format change ref. DCN-15P030016 | 2015/10/8 | EC-U01-150921-01 | Shu-Chen Ko |
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# Spec Sheet Contents


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## ■ ELECTRICAL SPECIFICATIONS

**Standard atmospheric conditions**

**Unless otherwise specified, the standard range of atmospheric conditions for making measurement and tests are as follow:**

**Ambient temperature :** 25+/-5°C

**Relative humidity :** 40%~70%

**If there is any doubt about the results, measurement shall be made within the following limits:**

**Ambient temperature :** 25+/-1°C

**Relative humidity :** 40%~70%

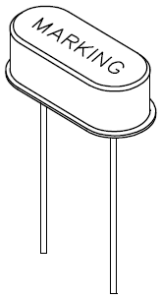
**Measure equipment**

**SAUNDERS 250B CRYSTAL IMPEDANCE METER.**

**Crystal cutting type**

**The crystal is using AT CUT (thickness shear mode).**

**Unit Weight :** 0.54 g +/- 0.05g



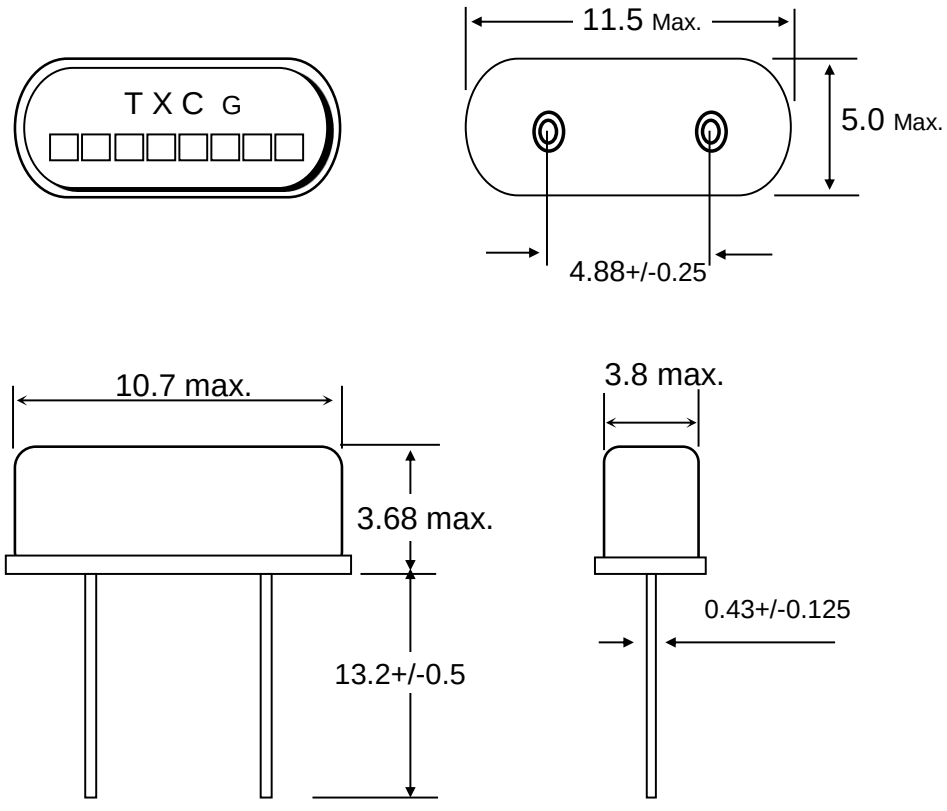

please refer to marking code page

| | Parameters | SYM. | Electrical Spec. | | | | Notes |
|---|---|---|---|---|---|---|---|
| | | | MIN. | TYP. | MAX. | UNITS | |
| 1 | Nominal Frequency | FL | | 12.000000 | | MHz | - |
| 2 | Oscillation Mode | - | | Fundamental | | - | - |
| 3 | Load Capacitance | CL | | 18 | | pF | - |
| 4 | Frequency Tolerance | FT | -30 | | +30 | ppm | at 25 °C +/- 3 °C |
| 5 | Frequency Stability | ST | -30 | | +30 | ppm | Over Operating Temp. Range (Reference 25°C) |
| 6 | Operating Temperature | OT | -40 | ~ | +85 | °C | - |
| 7 | Aging | - | -3 | | +3 | ppm | 1st Year |
| 8 | Drive level | DL | - | 100 | 500 | uW | - |
| 9 | Effective Resistance | Rr | - | - | 40 | Ω | - |
| 10 | Shunt Capacitance | C0 | - | - | 7 | pF | - |
| 11 | Insulation Resisstance | - | 500 | - | - | MΩ | at DC 100V |
| 12 | Storage Tempeature Range | - | -40 | ~ | +85 | °C | - |
| 13 | SPDB(+/-5000ppm) | SPDB | | ~ | -3 | dB | - |

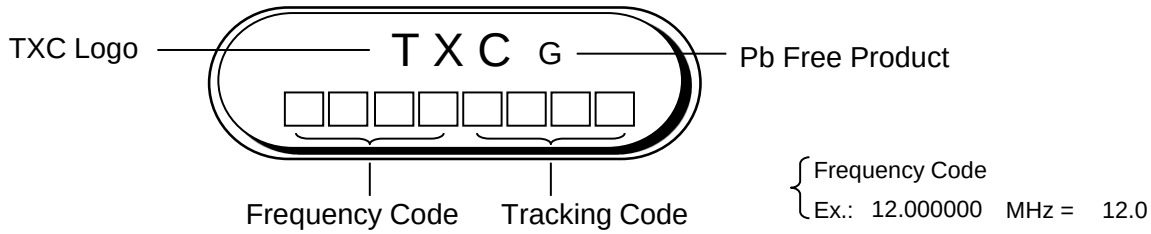
■ FACTORY LOCATION : CHINA

## DIMENSIONS

(Unit:mm)



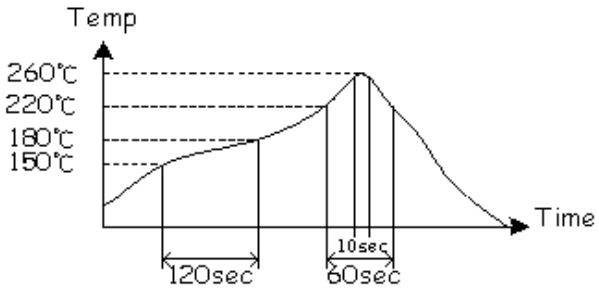

## MARKING




## SUGGESTED REFLOW PROFILE

Solder melting point :220+/-10 °C, 60 sec. Min.

Peak Temperature: 260 +/- 5 °C, 10 sec. Max.



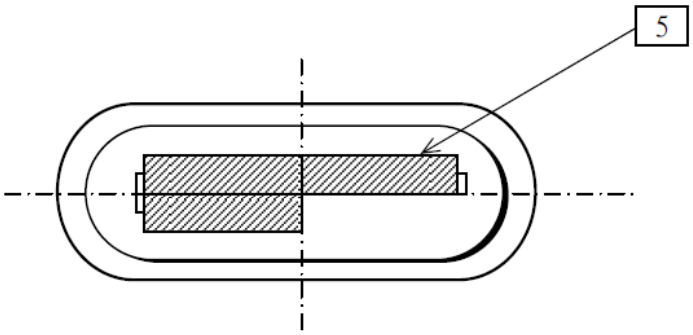

## SUGGESTED MANUAL SOLDER CONDITION

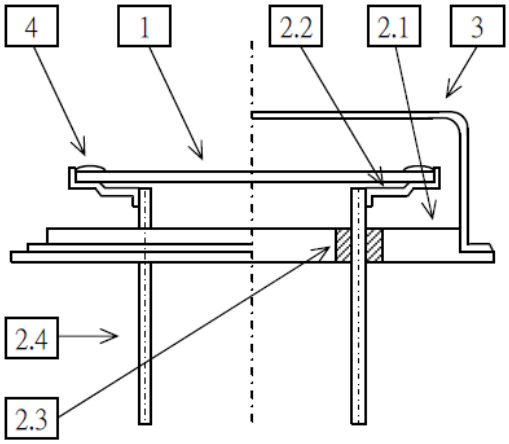
Temperature: 350 +/- 10 °C

Time: 3 sec.

Re-solder times: twice

## STRUCTURE ILLUSTRATION

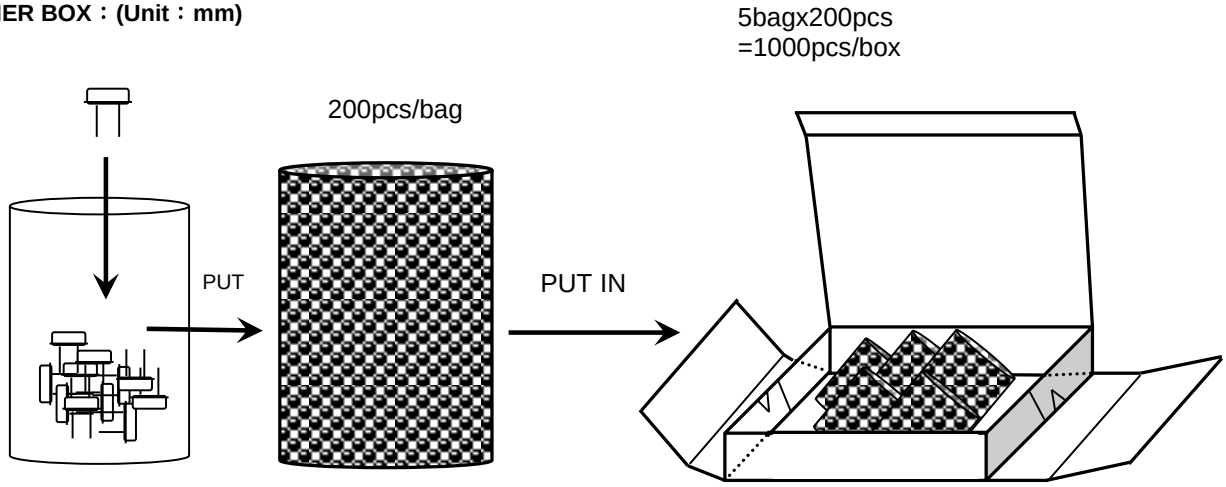


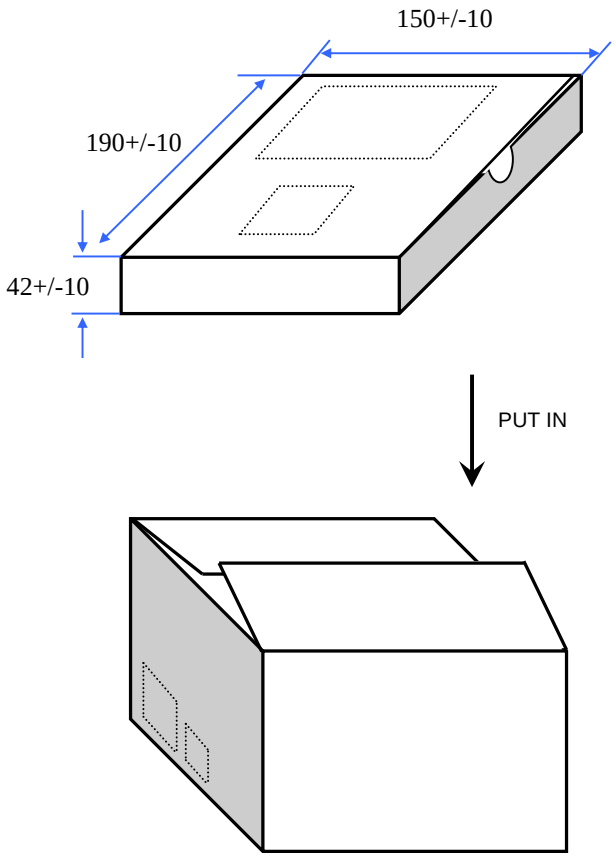

| NO | | COMPONENTS | | MATERIALS | FINISH/SPECIFICATIONS |
|---|---|---|---|---|---|
| 1 | | CRYSTAL BLANK | | QUARTZ ($SiO_2$) | / |
| 2 | 2.1 | CRYSTAL BASE | HOLDER | SPCC | Ni PLATED |
| | 2.2 | | SUPPORTER | NICKEL SILVER | / |
| | 2.3 | | GLASS | GLASS | / |
| | 2.4 | | LEAD | KOVAR | / |
| | | | | | (Coating : Sn/Ag/Cu) |
| 3 | | COVER | | NICKEL SILVER | / |
| 4 | | CONDUCTIVE ADHESIVE | | Ag + RESIN | / |
| 5 | | ELECTRODE | | Noble Metal | / |

## Packing For Pb Free Parts ：

**1.INNER BOX：(Unit：mm)**




**2.LOGO STICKER(CARTON and INNER BOX)：(Unit：mm)**




# (1) Put in stuff between space.

[STORAGE]

1.Don't be caught in the rain.

2.The storage environment shall be 5°C ~40°C temperature and 30% ~ 75%RH humidity and free from the sun shine.

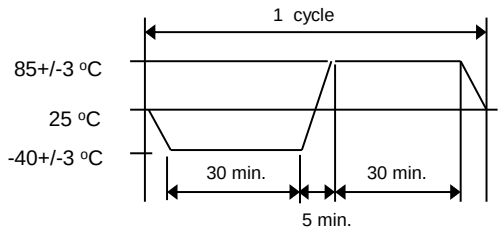
3.If customers have special requirements, we can paste labels according to it.

## ■ RELIABILITY SPECIFICATIONS

1.Mechanical Endurance

| No. | Test Item | Test Methods | Test Criteria |
|---|---|---|---|
| 1 | Drop test | 50 cm Height, Fall freely onto firm wood for 3 times. | B C |
| 1 | Mechanical Shock | 1000 G , 0.5 m Sec. , 3 times for all 3 directions. | B C |
| 1 | Vibration | Frequency range 10 ~ 2000 Hz<br>Acceleration 5G<br>Sweep time 20 minute<br>Pendicular axes each test time 4 hours<br>(Total test time 12 hours) | B C |
| 1 | Terminal Strength | 17.7N force for 60sec +/-1sec. | F |
| 2 | Solderability | Pb free :Temperature 235+/-5°C,Immersion time:5+/-1sec<br>Pb :Temperature 215+/-5°C,Immersion time:5+/-1sec | E |

2.Environmental Endurance

| No. | Test Item | Test Methods | SPEC |
|---|---|---|---|
| 2 | Resistance To Soldering Heat | Test temperature 260 +/- 5 °C<br>Test time 10 +/- 1 sec.<br>Emersion Rate 25 +/- 6 mm/s<br>Immersed of specimen 1.5mm | ACD |
| 2 | High Temp. Storage | + 85°C +/- 3 °C for 500 +/- 12 Hrs | ACD |
| 2 | Low Temp. Storage | - 40 °C +/- 3 °C for 500 +/-12 Hrs | ACD |
| 2 | Temperature cycle | -40°C~85°C,for 300 cycles.<br> | ACD |
| 3 | High Temp&Humidity | 85°C +/- 3°C , RH 85% , 500 Hrs | ACD |

## ■HANDING CAUTIONS

Prohibit the use of ultrasonic welding in Assemblying

## ■ RELIABILITY SPECIFICATIONS

| Specifications | |
|---|---|
| A | Frequency change: Within +/-20ppm or in customer's specification. |
| B | Frequency change: Within +/-10ppm or in customer's specification. |
| C | Equivalent series resistance(E.S.R) change: Within +/-15% or 10Ω(larger value). |
| D | After conditioning , quartz crystal units shall be subjected to standard atmospheric conditions for 24 hour, and measured. |
| E | Minimum 95% of immersed terminal shall be covered with new uniform solder. |
| F | No damage on specimen |

**Measurement condition**

Electrical characteristics measured by S&A250B or equivalent.

**NOTE:**

1. TXC requires one copy returned with signature and title of authorized individual that signifies acceptance of the attached specifications.
2. Orders received and accepted by TXC after return of signed copy of specification will be produced per these specifications.
3. Any changes to these specifications must be agreed upon by both parties and new revision of the "Product Specification Sheet" will be issued.
4. Any issuance of purchase order prior to consigning back the approval page of "Specification Sheets" from customers will be regarded as the agreement on the contents of these specifications.
5. The green product standard set by TXC is based upon the international standards.Related information is publicly described on the TXC's website, and updated regularly. The document is compliant with the latest green product quality system directives at the time.
6. Revision "Sx" is for engineering samples only. PE/RD's approval required.
7. Revision "Ax" is production ready. PE, QA and MFG's approval required.
8. Inform TXC in advance if you use ultrasonic welding in assembling process .